
Section 950
SURFACE TREATMENT DESIGN

950.01 Introduction**Scope**

The objective is to produce a pavement surface one stone thick with enough asphalt to hold the aggregate in place, but not so much that it will bleed.

When a one-sized cover aggregate is dropped by a spreader on an asphalt film the particles will lie in an unarranged position. After compaction and considerable traffic, the particles will become oriented into their densest position with about 20 percent voids between the particles. It is desirable to fill these voids about two-thirds to three-fourths full with asphalt. A typical design will call for 70 percent of the voids filled. Because of the meniscus effect of the residual asphalt left on the aggregate upon the evaporation of the water when emulsified asphalt is used, the residual asphalt can be reduced to 55 to 60 percent of the voids between the aggregates under average conditions.

Procedure:

1. Tabular Determination: The following table gives a range of asphalt and aggregate applications with respect to the specific size of aggregate being used. The suggested quantities of asphalt cover the average range of conditions that include primed granular bases and old pavement surfaces.. The quantities and types of materials may be varied according to local conditions and experience.

2. Lab Determination: A simple way of determining the quantity of aggregate is simply to spread the aggregate to be used over an area of one square yard. A pan 36 inches x 36 inches x 1 inch deep is suggested, as this will also allow determination of the asphalt quantity. Place aggregate in the pan carefully by hand, arranging the aggregate so that it fills the pan in the densest condition anticipated to exist in the field after the surface treatment has been subjected to traffic. In order to do this it is necessary to have a good visual image of the finished product. Determine the weight of the aggregate required in pounds per square yard. This weight will be the spread rate of the aggregate.

With the aggregate carefully arranged as described, fill the pan with water until the surface of the water comes just to the top of the aggregate. Measure this volume of water and use approximately two-thirds of that volume as the asphalt quantity required.

Quantities of Asphalt and Aggregate for Single Surface Treatments and Seal Coats					
Line	Nominal Size of Aggregate	Size No.	Quantity of Aggregate lb/yd ²	Quantity of Asphalt gal/yd ²	Type and Grade of Asphalt
1	3/4 to 3/8 inch	6	40-50	0.4 - 0.5	RS-2 CRS-2
2	1/2 inch to No. 4	7	25-30	0.3 - 0.4	RS-1, RS-2 CRS-1, CRS-2
3	3/8 inch to No. 8	8	20-25	0.2 - 0.35	RS-1, RS-2 CRS-1, CRS-2
4	No.4 to No. 16	9	15-20	0.15 - 0.2	RS-1, MS-1 CRS-1, HFMS-1
5	Sand	AASHTO M-6	9-15	0.11 - 0.15	RS-1, MS-1 CRS-1, HFMS-1

● These quantities of asphalt cover the average range of conditions that include primed granular bases and old pavement surfaces. The quantities and types of materials may be varied according to local conditions and experience.

● The lower application rates of asphalt shown in the above table should be used for aggregate having gradations on the fine side of the specified limits. The higher application rates should be used for aggregate having gradations on the coarse side of the specified limits.

● The weight of aggregate shown in the table is based on aggregate with a specific gravity of 2.65. In case the specific gravity of the aggregate used is lower than 2.55 or higher than 2.75 the amount shown in the table above should be multiplied by the ratio that the bulk specific gravity of the aggregate used bears to 2.65.

● It is important to adjust the asphalt content for the condition of the road, increasing it if the road is absorbent, badly cracked, or coarse, and decreasing it if the road is "fat" with flushed asphalt.

Texture	Correction*
	gal/yd ²
Black, flushed asphalt	-0.009 to -0.06
Smooth, non-porous	0.00
Absorbent	
- slightly porous, oxidized	0.03
- slightly pocked, porous, oxidized	0.06
- badly pocked, porous, oxidized	0.09

*This correction must be made from observations at the jobsite.